Global Journal of Molecular Evolution and Genomic

Vol. 3 (1), pp. 075-077, March, 2015.

http://www.globalscienceresearchjournals.org/

Full Length Research Paper

Effect of sumac on DNA

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Accepted 7 March, 2015

Abstract

For a long time, R. coriaria has been used as a spice by grinding the dried fruits with salt, and it has also been widely used as a medicinal herb in traditional medicine for its athero protective effect and its ability to treat eye diseases, wounds, bowel disorders, ring worms and skin disorders. In addition, R. coriaria has recently shown to have hepatoprotective, anti-ischemic, antimicrobial as well as hypoglycemic, anti-tumor andhyperlipidemic effects. Volatile substances, flavonoids, tannins and xanthones have been reported from this plant. Due to its easy collection and the remarkable biological activities, R. coriaria has been used both as food and medicine in some parts of the world especially in Iran. Tannin extracted from Sumac possesses potent antimigratory activity. Sumac yield tannin a substance used in vegetable tanning. Effect of TANNIN (plant polyphenolic compound) on DNA extract from spinach has been studied. Tannin is extracted by using acetone extraction where DNA is extracted by ethanol precipitation. The effect of tannin on DNA was studied by using different concentrations (10% to 30%) of tannin. The Optical density (O.D.) values of DNA decreased over incubation time indicating reduction in density upon addition of tannin which may be protective by repairing DNA or preventing DNA damage.

Keywords: Rhuscoriaria (sumac), atheroprotective effect, hepatoprotective, antimicrobial, hyperlipidemic, flavinoids, tannin, optical density.

INTRODUCTION

Sumac is any one of about 35 species of flowering plants in the genus Rhus and related genera, in the family Anacardiaceae. Sumacs grow in subtropical and temperate regions throughout the world, especially in Africa and North America. Sumacs are shrubs and small trees that can reach a height of 1–10 m (3.3–32.8 ft).The flowers are in dense panicles or spikes 5–30 cm (2.0–11.8 in) long, each flower very small, greenish, creamy white or red, with five petals. The fruits form dense clusters of reddish drupes called sumac bobs. The dried drupes of some species are ground to produce a tangy crimson spice.[Ref. no.2].

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Spice and Beverage Flavoring

The fruits (drupes) of the genus Rhus are ground into a reddish-purple powder used as a spice in Middle Eastern cuisine to add a lemony taste to salads or meat. In Arab cuisine, it is used as a garnish on meze dishes such as hummus and is added to salads in the Levant. In Iranian (Persian and Kurdish) cuisines, sumac is added to rice or kebab. In Jordanian and Turkish cuisines, it is added to salad-servings of kebab. Rhuscoriaria is used in the spice mixture za'atar. [Ref.no.2].

Toxicity

Some species formerly recognized in Rhus, such as poison ivy (Toxicodendronradicans), poison oak (Toxicodendrondiversilobum) and poison sumac (Toxicodendronvernix), have the allergen urushiol and can cause severe allergic reactions. Poison sumac may be identified by its white drupes, which are quite different from the red drupes of true Rhus species. [Ref.no.2].

TANNINS

Tannins are secondary metabolites of plants, non-nitrogenous, phenolic in nature.
They have a property to tan animal skin to convert to leather or hide.
Conversion imparts resistance to water, heat and abrasives.
They can be extracted using water-acetone/alcohol mixture.
They have a property to precipitate gelatin & heavy metals.[Ref.no.3].

So far there are few studies done .The aim of the study was the investigation of its DNA-protective effects in humans and animals. Prevention of the formation of strand breaks and oxidized DNA bases as well as the protection against H2O2- and (±)-anti-benzo[a]pyrene-7,8-dihydro-diol-9,10-epoxide (BPDE)-induced DNA-damage were monitored in human lymphocytes in a placebo controlled trial (N = 8/group) with ethanolic extract of sumac in single cell gel electrophoresis assays. Furthermore, DNA-protective effects of sumac were monitored in different inner organs of rats under identical conditions.[Ref.no.4].

MATERIALS AND METHODS

Tannin extraction from Sumac

Two grams of dry Sumac were ground using a mortar and pestle. To dissolve tannin in solvent, the ground Sumac was transferred to 50 mL Falcon tubes and 20 mL of acetone and water (7:3 ratio) was added. The collected tannin extracts were sonicated for 30 minutes at 4°C to break down additional materials associated with tannin. To pellet the additives and salts, the sonicated tannin extracts were centrifuged for 10 min at 2,500 rpm. The supernatant was separated from pellet (the pellet was discarded).The supernatant was subjected to Rota-evaporator to separate tannin from acetone. The extracted tannin was filtered and stored at 4°C until used.[Ref.no.1].

DNA Extraction from Spinach

1. Wash the spinach leaves with sterile water and rinse it with alcohol. Take around 10-15mm leaf disc and place it in 1.5ml vial tube (sterile tube).
2. Crush the leaf into fine pieces with a sterile tip.
3. Add 500 µl of pre-cooled solution A and crush again till the soup is green, this indicates cell lysis.
4. Transfer the vials into water bath maintained at 65-70°C and incubate for 5 minutes. Crush the leaves to release more green pigment and further incubate at 70°C in the water bath for 45-60 minutes.
5. Vortex for 5 sec and spin at 10,000rpm for 20 minutes at room temperature
6. Take the supernatant and add 1ml of cold alcohol and 50 µl of sodium acetate. Mix gently by inverting the vial and incubate at -20°C/4°C for 60 minutes.
7. Centrifuge the vial at 12,000rpm for 30 minutes at room temperature, drain out the supernatant completely and blot dry.
8. Add 100 µl of 70% alcohol and spin at 12,000rpm for 5 minutes. Drain out the supernatant completely and blot dry.
9. Suspend the DNA pellet in minimum amount of solution B (20-50µl).
10. Incubate the vial at 55c for 3-5 minutes for complete solubilisation.
11. Spin at 12,000rpm for 10 minutes to remove any insoluble material and collect the supernatant which is pure DNA. [Ref.no.5].

The extracted Tannin was then exposed to pure DNA sample at 10% and 30% concentrations at different time intervals. Then the Optical Density values were taken using Colorimeter at 540nm. The following observations were made;

OBSERVATIONS

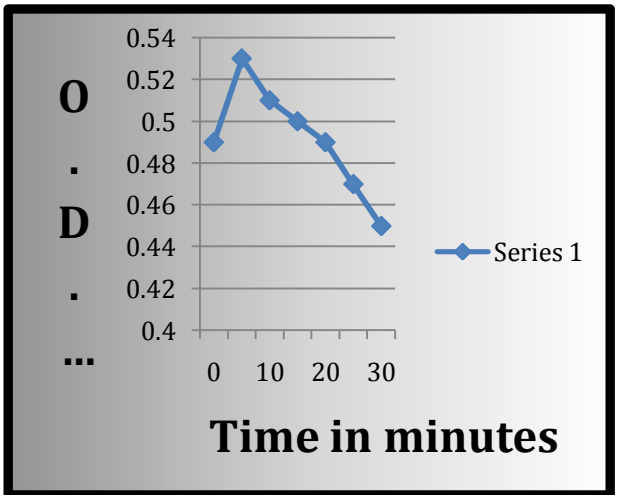
FOR 30% CONCENTRATION:

TIME	O.D.
0 min	0.89
5 mins	0.91
10 mins	0.90
15 mins	0.87
20 mins	0.84
25 mins	0.82
30 mins	0.81

For 10% concentration

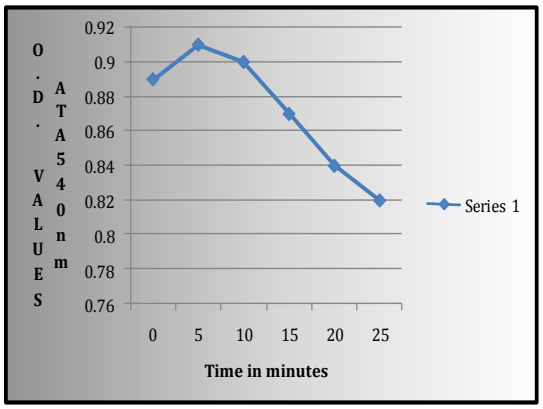
TIME	O.D.
0 min	0.49
5 mins	0.53
10 mins	0.51
15 mins	0.50
20 mins	0.49
25 mins	0.47
30 mins	0.45

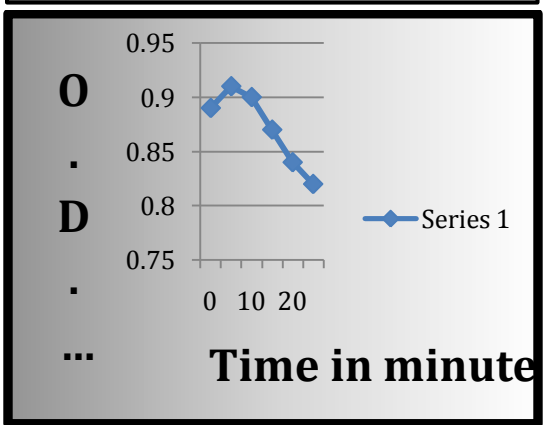
Renaturation curve for DNA at 10% concentration



Graphical Representation for the above Observations

Renaturation curve for DNA at 30% concentration





RESULT AND DISCUSSION

The above observations from this experiment gives us a picture of the renaturation effects of Sumac on the pure DNA extract. The above graphs show decrease in Optical density with increase in time of exposure of sumac on DNA which indicates that the DNA has undergone repair and renaturation.

ACKNOWLEDGEMENT

We acknowledge the help of Principal and Management of the St. Ann's college for Women for providing partial financial assistance under CPE UGC Grant.

We also acknowledge the HOD of Biochemistry Department, Osmania University and HOD of Microbiology, Bhavan's Science College,Sainikpuri for permitting us to use their equipment.

REFERENCES

(1) HaniehZargham and Ramin Zargham,2008 Nov; 11(2): 119-123.Tannin extracted from Sumac inhibits vascular smooth muscle cell migration; Mc Gill Journal of Medicine.
(2)en.wikipedia.org/wiki/Sumac.
(3)Notes on tannin from PharmaXchange.info.
(4) Asima Chakraborty et al. 10 February,2009; DNA Protective effect of Sumach(Rhus*coriaria* L.), a common spice: Results of human and animal studies; Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis,Volume-661.
(5) GENEI Bangalore genei (Genomic Kit) www.banagaloregenei.com